

## Evaluating Ground Water Storage towards Sustainable Water-Food-Energy Management

Beas Barik (1), Sahana Saheer (1), Amey Pathak (1), Subimal Ghosh (1,2)

(1) Department of Civil Engineering, Indian Institute of Technology Bombay, Mumbai, India, (2) Interdisciplinary Program in Climate Studies, Indian Institute of Technology Bombay, Mumbai, India

India's agricultural sector is largely dependent upon monsoon, however the monsoon mechanism has always been unpredictable and often meteorological droughts have occurred. In order to survive the meteorological droughts groundwater has been used extensively for irrigation. Government policies have also been framed to withdraw groundwater by providing energy required to pump it at subsidized rates to maintain the food security. The depleting groundwater goes unnoticed as it is overshadowed by the high agricultural productivity. However, if the groundwater depletion rate is overlooked, especially for the major agrarian zones, then irrigation cannot be dependent on groundwater for long, thus affecting the overall agricultural productivity. So, in this study we attempt to find out the present status of groundwater and its recharge and withdrawal rates considering the hydrological year (June to May) which coincides with the start of the agricultural season. The study area considered here are the two of the major agrarian zones, Maharashtra and Goa (Region 1) and North- Western India (comprising of the states of Punjab, Delhi, Haryana, Chandigarh and Rajasthan) (Region 2).

The two regions show opposite trends in groundwater depletion for the period 2002 to 2014. The Region 2 shows a consistent decreasing trend of groundwater whereas Region 1 shows a declining trend during the initial drought years but for the recent years it shows an increasing trend. Our results show the importance of region wise study, since groundwater variability across different regions depend on the rainfall received, cropping pattern, type of crops, soil and various other natural and anthropogenic factors. In order to formulate better and sustainable groundwater monitoring and management policies the key factors causing depletion or replenishment over the regions will be identified.